



PATENT SPECIFICATION

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COMPLETE SPECIFICATION.

Improved Means for Locking Nuts.

I, LEOPOLD SEEGER, of Rochefort, Belgium, Engineer, a subject of the King of Belgium, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to means for locking nuts and has for its object to prevent nuts on bolts from working loose, especially the nuts on railway and tramway fishplate bolts.

Numerous devices have been proposed and tried with a view to achieving the purpose mentioned above; but, up to the present, none of these devices has given lasting results. One of the chief causes of nuts working loose is the vibration to which the fastening is exposed, whilst it is often the result of the elongation of the bolt under the action of shock and vibration. For instance dished washers, rectangular or otherwise, have been proposed with the bolt hole eccentric thereof, also a bowed strip of spring metal with the hole centrally thereof.

According to the invention there is inserted between the nut and the surface against which it is to be tightened, a member which absorbs vibration and shock in such a manner as to keep the nut always in the position it occupied when tightened up. This member consists substantially of a flat spring the length of which is considerable as compared with the dimensions of the nut and which is pierced by a hole for the passage of the stem of the bolt, said hole being eccentric, that is to say, the two supporting arms of said flat spring are of unequal length and rest at their ends or effective ends only, on the surface of the object to be secured. The effect of this last condition is to subject the nut to a reaction which is exerted in an oblique direction relatively to the axis of the stem of the bolt, thus causing the nut to seize on said stem and still further hinder it from working loose. The flexibility

of said strip in the axial direction of the bolt, thus prevents the body of the bolt from stretching, the arched portion of the washer playing the part of a shock absorber.

The interposed flat springs may be varied in profile, dimensions and shape, that is to say, these members may vary in accordance with the bolts themselves and with the members to be bolted together.

Another object of the invention consists in providing such a strip which shall be easy to manufacture and of low cost. The machining of this strip may even consist of simple stamping without waste of material especially if the flat spring be of a rectangular profile, or a profile free from sharp re-entrant angles, a form which offers greater strength than other constructional shapes. In fact such re-entrant angles situated in close proximity to the hole for the passage of the bolt may have the effect of weakening the strip in its section perpendicular to said angles.

In the accompanying drawings, which illustrate by way of example, several embodiments of the invention Figure 1 is a sectional elevation of a bolt in position for tightening up; Figure 2 is a plan of the inserted strip Figure 3 is a view similar to Figure 1 with the nut screwed home; Figures 4 and 5 shew in side elevation and plan respectively another form of the inserted strip; Figures 6 and 7 shew respectively a plan and a side elevation of a strip with rounded re-entrant angles; Figures 8 and 9 are similar views of a rectangular strip; Figure 10 shews in side elevation a strip with a curled tip; Figure 11 shews in sectional side elevation and plan an application of the rectangular strip as a retaining member for a second bolt nut.

With reference to the drawings, and more particularly to Figures 1 to 3, 1 represents the stem of a bolt, 2 a nut and 3 the threaded portion of the stem 1 on

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which the nut 2 engages. Between the nut 2 and the adjacent surface of the object to be secured by the bolt, is inserted a strip 4 of tempered steel or other material, pierced by a hole for the passage of the stem 1. This hole is not situated centrally in the longitudinal direction of the strip, and the two supporting arms 4¹ and 4² of the latter are therefore of unequal length. After the nut 2 has been screwed home, the strip 4 will be flattened out as shown in Figure 3. The springy strip 4 exerts an upward reaction on the lower face of the nut 2; and, on the other hand, owing to the inequality of the two supporting arms 4¹ and 4², this reaction is exerted obliquely in relation to the longitudinal axis of the stem 1 and the nut 2 will seize more or less obliquely against the threaded portion 3 of the stem 1. The springy strip 4 may be broadened at its ends where it bears against the object to be secured by the bolt.

According to Figures 4 and 5, the strip terminates at one end in a spirally coiled tail 4³, an arrangement which increases the elasticity of the strip when the nut has been tightened up. With reference to Figures 6 and 7, the strip 4—the two branches 4¹ and 4² of which are unequal in length is widened on each side of the hole, the widened portion merging into the rest of the strip by angles which are more or less rounded off. In this manner the lines of least resistance formed by the sudden change of cross section in strips having sharp re-entrant angles, are suppressed.

With reference to Figures 8 and 9, the strip shown is of rectangular profile, the hole for the passage of the bolt being situated eccentrically, that is to say the two arms 4¹ and 4² are of unequal length and the curving of the strip is effected in the usual manner. It will be evident that this rectangular shape is the simplest form and the easiest to manufacture; and the locking effect will be the same as that of a strip having a complicated outline.

Figure 10 shews a strip in which increased elasticity is obtained by bending one of the ends in the shape of a hook 4³. This strip is the same as the one shown in Figures 4 and 5, except that the sharp re-entrant angles are suppressed and the strip rests on a sharp edge at 4².

Referring to Figure 11 the rectangular

flat spring 4 serves at the same time to prevent a second bolt nut 6 from working loose, because one of its arms bears against one of the side faces of said nut. When the two nuts 5 and 6 have been tightened up, they are thus prevented from working loose by one and the same flat spring 4.

From the foregoing, it will be evident that the interposition of an elastic strip between the nut and the adjacent surface of the object to be secured by the bolt will destroy the effects of vibration, jolting and shocks sustained by the mounting, these influences being absorbed by the elasticity of the interposed strip. This flat spring may be used with any kind of nut and in cases where the surface against which the nut is to be tightened is not large enough to provide a bearing for the spring 4, a bearing plate may be interposed. Such is the case for example with nuts on axle ends.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. Means for preventing nuts from working loose, consisting in interposing between the nut and the adjacent surface of the object to be secured by bolting, an elastic strip the length of which is considerable as compared with the dimensions of the nut and the two arms of which are of unequal length and rest at their ends, or effective ends, only, on the said surface of the object to be secured, said strip being arched or spiral in side elevation when in its normal state.

2. An elastic strip as claimed in Claim 1 of rectangular profile, that is to say uniform width, with a view to simplifying manufacture and make the strip cheaper.

3. Means simultaneously for locking two nuts comprising an elastic strip for locking one of the nuts as claimed in Claim 2, one end of which strip abuts against one of the lateral faces of the second nut.

4. Means for locking nuts substantially as hereinbefore set forth with reference to the accompanying drawings.

Dated the 6th day of October, 1923.

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[This Drawing is a reproduction of the Original on a reduced scale]

